BULLETIN

OF THE

TORREY BOTANICAL CLUB

VOL. 51

FOUNDED BY WILLIAM HENRY LEGGETT 1870

EDITORS

HERBERT McKENZIE DENSLOW
TRACY ELLIOT HAZEN

ASSOCIATE EDITORS

ALBERT FRANCIS BLAKESLEE
ALEXANDER WILLIAM EVANS
HENRY ALLAN GLEASON
ALFRED GUNDERSEN
GEORGE TRACY HASTINGS
MARSHALL AVERY HOWE
MICHAEL LEVINE
ARLOW BURDETTE STOUT

NEW YORK

1924-25

PUBLISHED FOR THE CLUB
THE INTELLIGENCER PRINTING COMPANY
LANCASTER, PENNSYLVANIA

Gen.
Natur.

CONTENTS

BRITTON, NATHANIEL LORD. Studies of West Indian plants—XII.... 1
RYDBERG, PER AXEL. Notes on Fabaceae—III..... 13
JOHNSON, ALICE MARIE. The mid-styled form of Piaropus paniculatus. 25
RICE, MABEL AGNES. Internal sori of Puccinia Sorghi..... 37
ARTHUR, JOSEPH CHARLES. New species of Uredineae—XV..... 51
BERRY, EDWARD WILBER. Fossil fruits from the Eastern Andes of Colombia..... 61
BLAKE, SIDNEY FAY. New Polygalas from Colombia..... 83
SMITH, CHARLES PIPER. Studies in the genus Lupinus—X..... 91
SCHAFFNER, JOHN HENRY. Expression of the sexual state in Sagittaria latifolia..... 103
HARRIS, JAMES ARTHUR. The tissue fluids of Cuscuta..... 127
HOWE, MARSHALL AVERY. Chinese marine algae (plates 1, 2)..... 133
RYDBERG, PER AXEL. The section Tuberarium of the genus Solanum in Mexico and Central America..... 145
RYDBERG, PER AXEL. The section Tuberarium of the genus Solanum in Mexico and Central America: concluding paper..... 167
FERGUSON, WILLIAM CASHMAN. Contributions to the flora of Long Island..... 177
PLITT, CHARLES CHRISTIAN, and PESSIN, LOUIS JEROME. A Study on the effect of evaporation and light on the distribution of lichens..... 203
DIXON, HUGH NEVILLE. New species of mosses from the Malay Peninsula (plates 3, 4)..... 225
GOLDSTEIN, BESSIE. Cytological study of living cells of tobacco plants affected with mosaic disease (plate 5)..... 261
SHREVE, FORREST. Across the Sonoran Desert..... 283
MUNZ, PHILIP ALEXANDER, and JOHNSTON, IVAN MURRAY. Miscellaneous notes on plants of Southern California..... 295
SMITH, CHARLES PIPER. Studies in the genus Lupinus—XI. Some new names and combinations..... 303
BARTRAM, EDWARD BUNTING. Studies in Tortula as represented in Southern Arizona (plates 6, 7)..... 335
SEIFRIZ, WILLIAM ERNEST. The gregarious flowering of the talipot palm, Corypha umbraculifera, at Peradeniya, Ceylon (plates 8, 9)..... 341
HOWE, MARSHALL AVERY. Notes on algae of Bermuda and the Bahamas 351
RYDBERG, PER AXEL. Some senecioid genera—I..... 369
SMALL, JOHN KUNKEL. Plant novelties from Florida..... 379
RYDBERG, PER AXEL. Some senecioid genera—II..... 409
BLAKE, SIDNEY FAY. New South American Verbesinas..... 421
GLEASON, HENRY ALLAN. Studies on the flora of northern South America—I..... 443
LEVINE, MICHAEL. Crown gall on Bryophyllum calycinum (plate 10).. 449
KARLING, JOHN SIDNEY. A preliminary account of the influence of light and temperature on growth and reproduction in Chara fragilis (plates 11–13)..... 469

INDEX TO AMERICAN BOTANICAL LITERATURE, 29, 69, 113, 155, 211, 275, 311, 361, 395, 437, 457, 489

INDEX TO VOLUME 51 503

Dates of Publication

No. 1, for January	Pages	1–36	Issued February	8, 1924.
No. 2, for February	"	37–82	" March	12, 1924.
No. 3, for March	"	83–126	" April	22, 1924.
No. 4, for April	"	127–166	" May	17, 1924.
No. 5, for May	"	167–224	" June	13, 1924.
No. 6, for June	"	225–282	" July	12, 1924.
No. 7, for July	"	283–334	" July	24, 1924.
No. 8, for August	"	335–368	" August	22, 1924.
No. 9, for September	"	369–408	" September	18, 1924.
No. 10, for October	"	409–442	" October	24, 1924.
No. 11, for November	"	443–468	" November	28, 1924.
No. 12, for December	"	469–512	" January	17, 1925.

Nos. 1–9 edited by H. M. Denslow, nos. 10–12 by T. E. Hazen.

Errata

VOLUME 50 (October, 1923)

Page 328, line 3 and line 6, for "*figure 8*" read "FIG. 9."

VOLUME 51

Page 9, line 1, for "*tubucina*" read "*tubicina.*"
Page 15, line 12, for "*Heffner*" read "*Heppner.*"
Page 18, lines 21 and 22, for "*alvordiensis*" read "*alvordensis.*"
Page 22, line 13, for "*Wallovoa*" read "*Wallowa.*"
Page 37, center, for "*Aveua*" read "*Avena.*"
Page 48, line 22, for "*hyphal*" read "*hyphae.*"
Page 174, line 5 from bottom, for "*S. appendiculata*" read "*S. appendiculatum.*"
Page 178, line 7 from bottom, for "*conferred*" read "*confirmed.*"
Page 182, lines 8, 12, 21, for "*Sporobolis*" read "*Sporobolus.*"
Page 182, line 8 from bottom, for "*P. dichotum*" read "*P. dichotomum.*"
Page 183, line 3 from bottom, for "*novae-anglae*" read "*novae-angliae.*"
Page 189, line 15, for "*Ulmus americanus*" read "*Ulmus americana.*"
Page 191, line 4, for "*Pleuropteris sachalinense*" read "*Pleuropterus sachalinensis.*"
Page 191, line 6, for "*Pleuropteris Zuccarini*" read "*Pleuropterus Zuccarinii.*"
Page 194, line 8 from bottom, for "*Lechia*" read "*Lechea.*"
Page 229, lines 4 and 6 from bottom, for "*S. bornense*" read "*S. bornensis.*"
Page 261, line 3, and p. 272, line 26, for "*sculeatissimum*" read "*aculeatissimum.*"
Page 371, line 7, for "*Liaburn*" read "*Liabum.*"
Page 396, line 22, for "*Polygales*" read "*Polygalas.*"
Page 396, line 25, for "*cespedezas*" read "*Lespedezas.*"
Page 413, line 14 from bottom, for "*cervariaefolium*" read "*cervariaefolius.*"

SCIENCE LIBRARY

FEB 1 1 1924

VOL. 51 JANUARY, 1924 No. 1

BULLETIN

OF THE

TORREY BOTANICAL CLUB

Editor

HERBERT McKENZIE DENSLOW

Associate Editors

Albert Francis Blakeslee
Alexander W. Evans
Henry Allan Gleason
Alfred Gundersen
George T. Hastings
Marshall Avery Howe
Michael Levine
Arlow Burdette Stout

CONTENTS

Studies of West Indian plants—XII. . . . NATHANIEL LORD BRITTON 1
Notes on Fabaceae—III. . . . . PER AXEL RYDBERG 45
The mid-styled form of Plantago patagonica. . . . ALICE M. JOHNSON 55
INDEX TO AMERICAN BOTANICAL LITERATURE. 59

PUBLISHED FOR THE CLUB

PRESS OF
THE NEW ERA PRINTING COMPANY
LANCASTER, PA.

Entered at the Post Office at Lancaster, Pa., as second-class matter.

THE INTELLIGENCER PRINTING CO.

LANCASTER, PA.

PRINTERS AND BINDERS OF

Technical and Scientific

Books and Periodicals

ESTIMATES FURNISHED

American Fern Journal

An illustrated quarterly devoted to the general study of ferns. Subscription, with membership in th AMERICAN FERN SOCIETY, $1.50 per annum; without membership, $1.25; to foreign subscribers, $1.35; life membership in the Society, $15.00. Volume I, six numbers, $3.00; other volumes, $1.25 each. Matter or publication should be sent to R. C. BENEDICT, 312 East 19th Street, Brooklyn, N. Y.; subscriptions and other business communications to E. J. WINSLOW, Auburndale, Mass.

LABORATORY SUPPLIES

OF EVERY DESCRIPTION

MICROSCOPES AND ACCESSORIES

Slides, Coverglasses, Stains, Glassware, Etc.

A well assorted stock always on hand

MEYER CAMERA & INSTRUMENT CO., Inc.

50 Third Avenue NEW YORK

Please mention the "Bulletin" when answering advertisements.

Vol. 51 No. 1

BULLETIN

OF THE

TORREY BOTANICAL CLUB

JANUARY, 1924

Studies of West Indian plants—XII

NATHANIEL LORD BRITTON

68. UNDESCRIBED SPECIES FROM CUBA

Cyperus naguensis Britton, sp. nov.

Culms short, about 8 dm. high, trigonous, smooth. Basal leaves rough-margined, strongly veined, 5–8 mm. wide, shorter than the culm, the apex attenuate, those of the involucre several, similar to the basal ones but shorter; umbel 8–10-rayed, the rays slender, the longer ones 6–10 cm. long; spikelets straw-colored, compressed, about 8-flowered, deciduous, 10–12 mm. long, very numerous in dense oval or subglobose, simple or compound spikes 2–3 cm. long; scales oblong-lanceolate, acute, striate, slightly spreading, 3 mm. long; achene linear, 1.5 m. long, about 3 times as long as thick, sharply pointed, narrowed at base.

Moist place between San Felipe and Nagua, Oriente (*Ekman 14720*). Similar to *C. stenolepis* Torr., but with shorter scales and achenes.

Reynosia camagueyensis Britton, sp. nov.

Twigs slender, leafy. Leaves oblong-obovate, coriaceous, entire, 12–17 mm. long, glabrous, very finely reticulate-veined, the midvein impressed above and prominent beneath, the base narrowed but obtuse, the apex obtuse, rounded or emarginate, tipped with a nearly straight awn about 0.7 mm. long, the petioles about 1 mm. long; fruit globose, rounded, 12–14 mm. in diameter, its peduncle about 5 mm. long.

Hills, Camaguey (*Padre Borrás*, 1918). Resembles *R. latifolia* Griseb., which has strongly reticulate leaves and ellipsoid pointed fruits.

[The BULLETIN for December (50: 373–414.) was issued Jan. 24, 1924.]

Peperomia Leoclemerocana Trelease, sp. nov.

A rather large assurgent glabrous herb; stem succulent and rather thick (5–8 mm.); leaves alternate, broadly elliptic-obovate, somewhat blunt-acuminate and often emarginulate, cuneate, rather large (2 × 5–4 × 6.5 cm.), drying rather coriaceous and dull, pinnately veined from about the middle, the principal ascending branches of the midrib 3 or 4 × 2; petiole scarcely 1 cm. long, winged; spikes terminal, paired or toward the end of a bracted stalk about 6 cm. long, 2 × 70–130 mm.; peduncle about 2 cm. long; bracts round-peltate, about .5 mm. in diameter and 10 to the pseudo-whorl; berries separated by somewhat evident ridges, ellipsoid, somewhat glandular, with stout curved beak; stigma anterior.

Cobre range, Sierra Maestra, Oriente (*Leon, Clement & Roca 10436*—the type at the New York Botanical Garden).

Clidemia Clementiana Britton, sp nov.

A shrub about 3 m. high, the very slender twigs, the petioles and the under leaf-surfaces puberulent. Leaves narrowly lanceolate, 1-nerved, chartaceous, entire, short-petioled, 2–6 cm. long, glabrous above, the apex acuminate, the base narrowed, the lateral venation faint, spreading; inflorescence 1–3-flowered; pedicels filiform, puberulent, 1–2 cm. long; calyx-lobes 4, linear, 2–3 mm. long; fruit 4-lobed, about 5 mm. in diameter.

Sierra Maestra, Oriente. TYPE from Loma del Gato, (*Leon, Clement and Roca 9830*).

Rondeletia Ekmanii Britton & Standley, sp. nov.

Branchlets brown, puberulent or scaberulous, finally glabrate; stipules deltoid-cuspidate, 2–3 mm. long, erect, persistent; petioles 2–3 mm. long, glabrous or obscurely puberulent; leaf blades broadly elliptic to elliptic-oval, 2–4 cm. long, 1.2–2.5 cm. wide, rounded or very obtuse at apex, rounded at base, coriaceous, dark green above, glabrous, lustrous, with prominulous-reticulate venation, paler beneath and brownish, glabrous, the costa salient, the lateral nerves few, distant, not conspicuous; inflorescence terminating the main branches and on short leafy lateral twigs, few-flowered, open, the flowers slender-pedicellate; rachis of the inflorescence scaberulous, the pedicels 4–5 mm. long; hypanthium globose, densely white-scaberulous; calyx-lobes linear-subulate, scarcely over 1 mm. long, subobtuse, brownish, scaberulous; corolla-tube 6 mm. long, dilated above, strigillose-scaberulous with white hairs, the 5 lobes broadly obovate, rounded at apex, tomentulose on the inner surface.

TYPE in the U. S. National Herbarium, No. 1,145,291, collected on banks of the Yara River, Oriente, August 14, 1922 (*E. L. Ekman 14852*).

Related to *R. calophylla* Standley,* but evidently distinct in the small and narrow calyx-lobes.

The type of *R. calophylla* was collected in the Sierra Maestra in July, 1922, by Brother Leon. Dr. Ekman also obtained it in August, 1922, at Arroyo Corojo, Nagua, Oriente (No. 14729).

69. AN UNDESCRIBED SPECIES FROM HISPANIOLA

Kallstroemia incana Rydberg, sp. nov.

Kallstroemia caribaea Urban, Symb. Ant. **8**: 319. 1920. Not *K. caribaea* Rydberg, 1910.

A diffusely branched herb, somewhat woody at the base; stems spreading, 2–3 dm. long, with coarser spreading and finer more appressed hairs, terete; stipules linear-oblong, 2–3 mm. long, tardily deciduous; leaves 1–1.5 cm. long; petioles 2–3 mm. long; leaflets mostly 3 pairs, obliquely ovate, 3–5 mm. long, hoary on both sides, acutish; peduncles 2–3 mm. long; sepals lance-linear, acute, 3 mm. long; petals elliptic-obovate, light yellow, 3 mm. long; fruit grayish-strigose, about 5 mm. broad, the beak 2 mm. long, conic at the base; carpels cross-ridged on the back and reticulate on the faces.

TYPE collected at Barahona, Santo Domingo, July 1920, *Fuertes 418* (herbarium of the New York Botanical Garden); also collected at Rincon, October 1911, *Fuertes 1352*.

The two numbers cited were determined by Urban as *K. caribaea* and included under that name in his Flora Domingensis, but it differs in the hoary pubescence, the small leaflets, the small petals, scarcely half as long as in *K. caribaea*, the short peduncles and short beak on the small fruit. It approaches more *K. curta* Rydberg, from Curaçao, with which it has the following characters in common: small leaflets, short peduncles, small petals and fruit, and short beak; but it is more canescent, more branched, with shorter internodes and smaller leaves, and the beak different, not at all swollen.

---

* Bull. Torrey Club **50**: 48. 1923.

70. UNDESCRIBED SPECIES FROM TRINIDAD

Anthurium aripoense N. E. Brown, sp. nov.

Glabrous in all parts. Petioles about 75 cm. long and (when dried) 4 mm. thick, sheathing for about 7 cm. at their base, apparently more or less flattened above with obtuse edges, rounded on the back; blades about 34 cm. long, 26 cm. broad across the basal lobes and 18½ cm. broad at the constriction, cordate, with the basal lobes slightly constricted into the front lobe at about 11 cm. above the insertion of the petiole; basal sinus about 4 cm. deep, broadly open, rounded; basal lobes semi-orbicular; front lobe ovate, abruptly acute, apiculate; both surfaces green; basal nerves 4 on each side of the midrib, the 3 outer united and denuded at the sinus for about 25 mm., much curved and all excurrent at the margin below the middle of the leaf; the inner one free, ascending and excurrent at the apex, running subparallel with the margin at about 12–15 mm. from it; primary lateral veins about 7 on each side of the midrib, with others similar but less prominent between them, widely spreading, subparallel, nearly straight. Peduncle about 57 cm. long, 4 mm. thick (dried), apparently terete. Spathe 11 cm. long, 12 mm. broad, strap-shaped or broadly linear, with a subulate point about 25 mm. long. Spadix 15 cm. long, 5 mm. thick at the base, much longer than the spathe, on a stipe 5 mm. long, apparently violaceous or dark purple. Flowers diamond-shaped, 4 mm. in their longer and 3 mm. in their shorter diameter.

Heights of Aripo, (*Broadway 9924*).

The venation of the leaf of this species is on the same plan as that of *A. Guildingii* Schott, but in outline the slight constriction above the basal lobes brings it nearer to *A. panduraeforme* Schott.

Piper maravalanum Trelease, sp. nov.

Stem nodose, glabrous; leaves ovate or elliptic-ovate, acuminate, equilaterally rounded at base, rather large (6–9 × 15–17 cm.), pinnately nerved from below the middle, the nerves about 5 × 2 and sparingly pubescent beneath; petiole rather short (scarcely 10 mm.), not winged; spikes opposite the leaves, as yet comparatively short and thick (2 × 15 mm.), mucronate; peduncle very short (scarce 5 mm.); bracts lunulate-subpeltate, rusty-ciliate; flowers sessile, perfect; stigmas 3, minute, sessile.

Maraval, December 30, 1914, (*Broadway 7829*, the TYPE in the New York Botanical Garden).

Scarcely to be placed anywhere except in close connection with *P. Schackii* and *P. ovatum*; but pubescent beneath on the veins.

Piper aripoense Trelease, sp. nov.

A shrub, 1 m. tall; flowering internodes moderately slender and short, zig-zag, hirsute; leaves elliptic or oblanceolate-elliptic, acuminate, more or less unequally cordulate, moderately large (5×14–9×20 cm.), pinnately nerved from below the upper fourth, the nerves about 9 × 2, paler and appressed-hirsute on the nerves beneath; petiole short (scant 5—exceptionally 10 mm.), sometimes covered by the longer side of the base, hairy, winged to the blade; spikes opposite the leaves, rather thick and short (4 × 25 mm.), blunt; peduncle short (5 mm.), hirsute; bracts concave-incurved, glabrous; flowers sessile, perfect; stigmas 3, sessile; berries subglobose, glabrous.

Heights of Aripo (*Britton and Freeman 2353*, the TYPE at the New York Botanical Garden).

Prestonia Brittoni N. E. Brown, sp. nov.

Stem twining, 3 mm. thick at the flowering parts, glabrous. Leaves opposite, stipulate; petioles in the specimen seen 15 mm. long, glabrous; blade about 16 cm. long and 7½ cm. broad, oblong-elliptic, shortly acute and apiculate at the apex, rounded at the base, glabrous on both sides, with 8–9 primary veins on each side of the midrib inarching and uniting 5 mm. from the margin; stipules formed of a number of small teeth 1 mm. long between the bases of the petioles. Cymes axillary pedunculate, 6–8 cm. in diameter, quite glabrous in all parts; peduncle 3–4 cm. long, nearly 2 mm. thick. Pedicels 15–25 mm. long. Sepals 10 mm. long and 4–5 mm. broad, oblong, obtuse, rather thick; at the base of each sepal, between it and the corolla is a broadly deltoid-ovate obtuse gland about 1 mm. long. Corolla only seen in bud and in that condition the tube is 12 mm. long and 3 mm. in diameter, cylindric, not dilated at any part, surmounted by a truncate-based acute cone 5 mm. long and 6½ mm. in diameter formed by the contorted lobes; mouth of the tube raised within into a distinct rim about 1 mm. high, without processes or other appendages; lobes as unfolded from the bud 5 mm. long and 6 mm. broad, suborbicular, entire. Stamens inserted 5 mm. below the top of the corolla-tube; filaments 1 mm. long; anthers 5 mm. long, not or scarcely exserted. Ovary surrounded by 5 large faintly crenulate or faintly toothed fleshy lobes.

Heights of Aripo (*Broadway 10009*).

Decastelma trinitense N. E. Brown, sp. nov.

Stem twining, up to 2 mm. thick at the flowering part, with internodes 2–3 cm. long, minutely puberulous, brown. Leaves spreading; petiole 4–6 mm. long, minutely puberulous; blade

2–6 cm. long, 15–30 mm. broad, ovate or oblong-lanceolate, acuminate, rounded at the base, glabrous on both sides to the eye, but with a microscopic scattered pubescence above, where the midrib is also minutely puberulous; primary veins 3–5 on each side of the midrib, distant, inarching and uniting into a submarginal vein 2–3 mm. from the margin, not prominent on either surface. Flowers in small sessile umbellate clusters at the nodes of leafless branches. Bracts very minute. Pedicels 2–2½ mm. long, and together with the flowering branches minutely puberulous. Calyx 5-lobed to the base; lobes about ⅔ mm. long, ovate, obtuse, thinly and very minutely puberulous. Corolla about 3 mm. in diameter; tube about 0.75 mm. long, glabrous; lobes spreading, about 1 mm. long, ovate, subacute, minutely and densely puberulous within; each sinus with a thickening or slight gibbosity, which seems nearly or quite to touch the staminal column so as to form 5 small pocket-like entrances to the tube at the base of the lobes. Staminal column subsessile, about 0.75 mm. long, somewhat conical, truncate at the apex. Corona of 5 lobes arising from the staminal column at the base of the anthers, minute, about ¼ mm. long, pressed close against the back of the anthers and shorter than the latter, ovate, obtuse; they seem to be connected at the base by a minute tooth under the anther-wings, but in the dried flowers this is difficult to determine.

Trinidad (*Dannouse 6419*, TYPE). Collected in 1898.

The genus *Decastelma* is very like *Metastelma* in appearance, but differs by having the staminal column subsessile instead of with a long stipe, and by the corona arising from the staminal column at the base of the anthers instead of at the mouth of the corolla-tube. But the description of the corona of *Decastelma* as given by Schlechter is entirely wrong, unless the flowers on different specimens vary very much. For in the type of the genus, *D. Broadwayi* Schltr. (*Broadway 474*), the flowers that I have examined have a corona consisting of 5 lobes only, which are shorter than the staminal column and pressed close to it; they are broader than long and somewhat truncate at the three-toothed top, the middle tooth being minute.

Probably some species from South America, now placed under the genus *Metastelma*, really belong to *Decastelma*.

71. A NEW GENUS OF MELASTOMACEAE FROM TRINIDAD

NECRAMIUM Britton, gen. nov.

An erect shrub with long branches. Leaves opposite, large, membranous, short-petioled, with a strong midrib and three

pairs of veins, the first pair from near the base, the second pair from a short distance above, the third pair from below the middle, the transverse venation widely spreading. Inflorescence of sessile panicles borne on the branches much below the leaves, the panicle-branches filiform; flowers 2 or 3 together, sessile, subtended by subfoliaceous bractlets; calyx subcampanulate with 4 subulate teeth.

Necramium gigantophyllum Britton, sp. nov.

Stems slender, simple or few-branched, quadrangular, 2 m. high or higher, densely scurfy-puberulent above. Leaves oblong to oblong-oblanceolate, 2–4 dm. long, 12 cm. wide or less, entire, green on both sides, but paler beneath than above, glabrous above, scurfy-puberulent on the veins beneath, the apex acuminate, the base narrowed, the stout scurfy petioles 1–2 cm. long; panicles densely pubescent, several-flowered, about 4 cm. long; bractlets oblong-lanceolate, concave, acute, pubescent, 3 mm. long; calyx-tube 2 mm. long, its teeth 1 mm. long; petals and stamens unknown.

Forests at high altitudes, northern mountain range; TYPE from Heights of Aripo (*Trinidad Herbarium 9798*, collected by Broadway, January 10–26, 1922); Mount Tocuche (*Britton, Hazen & Mendelson 1334*), April 3–5, 1920.

72. THE GENUS DORSTENIA IN THE WEST INDIES

Leaves large, deeply lobed or undulate; receptacle quadrate.	1. *D. Contrajerva.*
Leaves small, dentate, crenate or entire; receptacle suborbicular, discoid or cyathiform.	
Leaves not peltate.	
Leaves orbicular, deeply cordate.	
Leaves crenate; receptacle cyathiform.	2. *D. crenulata.*
Leaves entire or obsoletely repand.	
Receptacle pubescent, discoid.	3. *D. tuberosa.*
Receptacle puberulent, about as long as broad	4. *D. Rocana.*
Leaves ovate to oblong or elliptic.	
Leaves ovate, deeply cordate.	5. *D. cordifolia.*
Leaves oblong to elliptic, cordate or subcordate, crenulate.	6. *D. tubicina.*
Leaves peltate.	
Leaves ovate-oblong, peltate very near the base	7. *D. petraea.*
Leaves ovate to orbicular, peltate at the middle or somewhat below.	
Leaves orbicular, pubescent on both sides.	8. *D. peltata.*
Leaves suborbicular to ovate, more or less longer than broad.	

Glabrous throughout; leaves rounded at both ends or the apex very obtuse. 9. *D. crassipes.*
Pubescent or puberulent; leaves acute or bluntly pointed.
Leaves suborbicular, very bluntly pointed. 10. *D. erythrandra.*
Leaves ovate.
Peduncles and petioles puberulent; leaves 6–8 cm. long. 11. *D. Roigii.*
Peduncles and petioles tomentulose or pubescent; leaves 3–5 cm. long.
Receptacle tomentulose, ciliate; peduncle about as long as the petioles. 12. *D. confusa.*
Receptacle puberulent; peduncle much shorter than the petioles. 13. *D. jamaicensis.*

1. DORSTENIA CONTRAYERVA L. Sp. Pl. 121. 1753

Porto Rico; St. Martin; Guadeloupe; Martinique; St. Vincent; Trinidad; Mexico to Colombia and Peru.

2. DORSTENIA CRENULATA C. Wright; Griseb. Mem. Ann. Acad. II. **8**: 173. 1860

Banks of rivulets, Monte Verde, Cuba, (*Wright 1447*).

3. DORSTENIA TUBEROSA C. Wright; Griseb. Mem. Ann. Acad. II. **8**: 173. 1860

Mountains of northern Oriente, Cuba.

4. **Dorstenia Rocana** Britton, sp. nov.

Rootstock short. Petioles very slender, tomentulose, 5 cm. long or less; leaf-blades orbicular, membranous, deeply cordate, rounded, entire, or some of them obscurely repand, puberulent on the veins beneath, otherwise glabrate, 10–23 mm. in diameter; peduncle filiform, puberulent, about as long as the petioles; receptacle cyathiform, about 5 mm. long and 4 mm. in diameter, puberulent, narrowed below, purple-margined above.

Shaded rocks on banks of Cupeyales, Banao Mountains, Santa Clara, Cuba (*Brother Leon & Father Roca, 8092*, August 5, 1918).

5. DORSTENIA CORDIFOLIA Sw. Prodr. 31. 1788

Central and western Jamaica. Recorded from Haiti.

6. DORSTENIA TUBUCINA R. & P. Fl. Per. 1: 65

Arima Savanna, Trinidad, collected by Purdie, according to Grisebach.

7. DORSTENIA PETRAEA Griseb. Cat. Pl. Cub. 58. 1866

Mountains of southern Oriente, Cuba.

8. DORSTENIA PELTATA Spreng. Neue Entd. 3: 22. 1822

Santo Domingo, near Samana Bay.

9. DORSTENIA CRASSIPES C. Wright; Griseb. Cat. Pl. Cub. 58. 1866

Near La Catalina, Oriente, Cuba (*Wright 2224*).

10. DORSTENIA ERYTHRANDRA C. Wright; Griseb. Cat. Pl. Cub. 58. 1866

Rocks by the sea, Baracoa, Oriente, Cuba (*Wright 2225*).

11. **Dorstenia Roigii** Britton, sp. nov.

Rootstock stout, 8–10 cm. long, 5–6 mm. thick. Petioles rather stout, densely puberulent, 15 cm. long or less; leaf-blades ovate, peltate below the middle, chartaceous when dry, coarsely undulate-dentate all around, strongly veined, 6–8 cm. long, dark green and scabrous above, paler and densely puberulent beneath, the apex obtuse or acute, the base rounded; peduncle puberulent, 5–7 cm. long; receptacle orbicular, nearly flat, peltate, about 10 mm. in diameter.

On rocks at the foot of Mogote de la Jagua, Consolacion del Norte, Pinar del Rio, Cuba, June 17, 1923 (*Roig 2547*).

12. **Dorstenia confusa** Britton, sp. nov.

Rootstock slender, tuberiferous. Petioles slender, tomentulose, 4–6 cm. long; leaf-blades broadly ovate, membranous, 2.5–3 cm. long, peltate somewhat below the middle, finely pubescent beneath, especially on the veins, repand-crenate, the apex blunt, the base rounded; peduncle tomentulose, about 4 cm. long; receptacle orbicular, nearly discoid, 6 mm. in diameter, tomentulose, ciliate.

Monte Verde, Oriente, Cuba (*Wright 2226*, in Gray Herbarium).

13. DORSTENIA JAMAICENSIS Britton, Bull. Torrey Club **35**: 567. 1908

Limestone cliffs, Manchester, Jamaica.

73. UNDESCRIBED SPECIES FROM PORTO RICO

Maytenus ponceana Britton, sp. nov.

A tree about 12 m. high, with slender, somewhat tortuous, glabrous twigs. Leaves oblong, or oblong-obovate, coriaceous, 9 cm. long or less, indistinctly few-veined with the midrib rather prominent on both sides, shining above, dull beneath, the apex bluntly short-acuminate or obtuse, the base subcuneate, the rather slender petioles 6–8 mm. long; fruiting pedicels 3–5 mm. long, solitary or 2 together in the axils; fruit globose, whitish, 6–8 mm. in diameter.

Hillside, Rio Portugues, north of Ponce (*Britton 7818*). In fruit Feb. 12, 1923.

Eugenia Underwoodii Britton, sp. nov.

A shrub, 2.5–3 m. high, much branched, the very slender gray terete twigs puberulent when young, the inflorescence pubescent. Leaves elliptic or elliptic-lanceolate, chartaceous, 2–5 cm. long, slightly paler green beneath than above, somewhat shining, delicately veined and scarcely reticulated, rather coarsely punctate, flat, the apex acuminate, the base narrowed, the puberulent petioles 1.5–2.5 mm. long; flowers in small short-peduncled racemes near the ends of the twigs; pedicels 2–3 mm. long; bracts about 1 mm. long; calyx-tube campanulate, glabrate, about 1.5 mm. long, the lobes a little shorter, puberulent, ciliate, obtuse; petals nearly 2 mm. long; fruit unknown.

Collected at Yauco. (*L. M. Underwood & R. F. Griggs, 639.*)

Eugenia boqueronensis Britton, sp. nov.

A tree about 8 m. high, the slender short twigs gray, densely tomentose when young. Leaves ovate or elliptic-ovate, coriaceous, 2–3.5 cm. long, shining, nearly equally green on both sides, coarsely blackish-punctate, finely pinnately veined and scarcely reticulated, pubescent on the midvein beneath when young, glabrous or very nearly so when mature, the apex abruptly and bluntly acuminate, the base narrowed, the stout pubescent petioles 2–3 mm. long; racemes few-flowered, about 1 cm. long, borne in the uppermost axils, densely tomentose; pedicels about 3 mm. long; bracts oblong, shorter than the pedicels; calyx-lobes broad, rounded or obtuse, about 1.5 mm. long; petals rounded, not longer than the calyx-lobes; fruit unknown.

Base of limestone hill, Salinas de Boqueron, (*Britton, Cowell & Brown, 4627*).

Eugenia Stewardsonii Britton, sp. nov.

A tree, 5–10 m. high, glabrous throughout, the slender twigs gray. Leaves ovate, subchartaceous, very nearly sessile, 4–6 cm. long, bright green and shining on both sides, the venation rather prominent, coarsely reticulated, the apex obtuse or rounded, the base rounded or subcordate, the stout petioles about 1 mm. long; flowers sessile, in lateral clusters below the leaves; larger calyx-lobes obtuse, about 2 mm. long; fruit subglobose or depressed-globose, 5–7 mm. in diameter.

Mountain forests and summits. Central Cordillera of Porto Rico. Type from the summit of Monte Torrecillo (*Britton, Cowell & Stewardson Brown, 5603*). Included by Urban in *Eugenia cordata* (Sw.) DC.

Eugenia (?) **corozalensis** Britton, sp. nov.

A tree about 6 m. high, the rather slender subterete glabrous forking twigs slightly enlarged below the internodes. Leaves oval-orbicular, chartaceous, glabrous, sessile, 4–7 cm. long, green on both sides, densely punctate, the apex rounded, the base cordate, the venation slender, loosely reticulated; flowers and fruit unknown.

Limestone hill, Corozal (*Britton 7832*).

Eugenia (?) **xerophytica** Britton, sp. nov.

A shrub, or a small tree up to about 4 m. high, much branched, the slender terete twigs and the leaves glabrous. Leaves suborbicular or some of them a little broader than long, coriaceous, glabrous, shining above, yellow-green and reticulate-veined on both sides, 1.5–5 cm. long, the apex obtuse, rounded or short-tipped, the base subcordate or rounded, the stout petioles 2–4 mm. long; flowers and fruit unknown.

Limestone rocks, Cayo Muertos, Porto Rico, (*Britton, Cowell & Brown, 4982*, TYPE); limestone hill, El Tuque, west of Ponce (*Britton 7915*).

Calyptranthes portoricensis Britton, sp. nov.

A tree or shrub, the twigs and inflorescence densely brown-pubescent. Leaves elliptic or ovate-elliptic, coriaceous, glabrous above, pubescent beneath when young, 3–7 cm. long, very obscurely punctate, the apex rounded or acutish, the base obtuse, the midvein prominent beneath, the lateral venation obscure;

peduncles rather stout, 7 cm. long or shorter; panicles several-flowered, the flowers subglomerate, nearly sessile; calyx densely brown-pubescent, about 2 mm. long, obovoid, rounded; fruit finely pubescent, globose, about 5 mm. in diameter.

Vicinity of Maricao. Type from Monte Alegrillo (*Stevens 4718*).

Notes on Fabaceae—III

PER AXEL RYDBERG

1. HOMALOBUS (*cont.*)

F. COLLINI

Pod not with prominent coriaceous sutures.
  Pod straight or nearly so.
    Body of the pod 2–2.5 cm. long, not mottled, short-villous. 46. *H. collinus.*
    Body of the pod 2.5–3 cm. long, usually mottled, strigose. 47. *H. californicus.*
  Pod distinctly curved.
    Pod curved in less than a circle.
      Pod erect; leaflets linear. 48. *H. Tweedyi.*
      Pod pendulous.
        Body of the pod 1–1.5 cm. long; leaflets oblong. 49. *H. Laurentii.*
        Body of the pod 2–3 cm. long; leaflets obovate or obcordate.
          Stem and leaves decidedly pubescent.
            Stem and leaves long-villous, body of pod curved usually in less than a semicircle.
              Pod about 4 mm. wide. 50. *H. Gibbsii.*
              Pod about 6 mm. wide. 51. *H. Plummerae.*
            Stem and leaves short-hairy with incurved hairs.
              Body of the fruit 6–7 mm. wide, curved about one-third of a circle, sinuate on the lower suture. 52. *H. sinuatus.*
              Body of the fruit 4–5 mm. wide, curved in about a semicircle, not sinuate on the lower suture. 53. *H. Whitedii.*
          Stem glabrous; leaves glabrous above, sparingly short hairy beneath, often only on the margin and ribs. 54. *H. subglaber.*
    Pod spirally curved, the body forming one and a half to two circles; leaflets linear or oblong.
      Corolla more than 1 cm. long; pod 4–4.5 mm. broad, strongly reticulate. 55. *H. speirocarpus.*
      Corolla 5–6 mm. long; pod 3–3.5 mm. broad. 56. *H. alvordensis.*
Pod with thick coriaceous sutures; leaflets linear.
  Stipe of the pod nearly as long as the flat body. 57. *H. podocarpus.*
  Stipe of the pod about half as long as the more turgid body. 58. *H. bicristatus.*

46. HOMALOBUS COLLINUS (Dougl.) Rydb.

Phaca collina Hook., was described from specimens collected by Douglas in the Blue Mountains, Oregon. Hooker described the corolla as having a purple spot and G. Don gives it as purple. As far as I know the corolla in all the species of the group is ochroleucous or straw-colored without any purple. In herbarium specimens the corolla often shows a darker spot, but this is probably due to stain from the pistil. In any case this darker spot contains no purple or blue. Otherwise, Hooker's description is full and agrees with our plant so closely that there seems to be no doubt about the correctness of our interpretation. The range of the species includes Washington and Oregon, southern British Columbia, and western Idaho *Astragalus cyrtoides* A. Gray, is evidently a synonym of this. See under *A. Gibbsii*.

47. HOMALOBUS CALIFORNICUS (A. Gray) Heller. This is closely related to the preceding and is distinguished mainly by its longer and mottled pod*.

NORTHERN CALIFORNIA: Hornbrook, *T. Howell 1351;* between Iguna and Weed, *Heller 8082;* Pit River Ferry, *H. E. Brown 284;* Mount Shasta, *464;* Weed, *L. E. Smith 197;* Yreka, *Greene*, in 1876.

48. **Homalobus Tweedyi** (Canby) Rydb. comb. nov.

Astragalus Tweedyi Canby, Bot. Gaz. **15:** 150. 1890.

This is related on the one hand to *H. collinus* and on the other to *H. Gibbsii*, but it differs from both in the ascending stipe and nearly erect body of the fruit. In general habit and in the narrow leaflets it resembles *H. collinus*, but the pod is curved as in *H. Gibbsii*.

WASHINGTON: Yakima County, *Brandegee 731.*

OREGON: "Eastern Oregon," *T. Howell*, in 1880; Fifteen Mile Creek, *Lloyd*, in 1894.

* Jones in his recent "Revision" placed this species in the *Homalobi*, together with *Astragalus stenophyllus, A. Antiselli, A. porrectus* and *A. inversus*, giving it No. 7, while the rest of the group he placed in his *Collini, A. collinus*, its closest relative being No. 93.

49. **Homalobus Laurentii** Rydb. sp. nov.

A perennial, with a cespitose caudex; stems 3–4 dm. high, striate, short-pubescent with incurved hairs; stipules triangular, 3–5 mm. long; leaves 3–7 cm. long; leaflets seven to seventeen, oblong, 8–13 mm. long, short-villous on both sides; racemes 1–2 dm. long; bracts lanceolate, 2–3 mm. long; calyx short-villous, the tube 8 mm. long, gibbous on the upper side, the two upper teeth triangular, the three lower lanceolate, 2 mm. long; corolla achroleucous; pod villous, stipitate, the stipe 5–7 mm. long, the body slightly curved, 10–15 mm. long, 4 mm. wide; seed obliquely reniform, 3 mm. long, 2 mm. wide.

TYPE collected east of Heffner, Oregon, *W. E. Lawrence 744* (herbarium of the New York Botanical Garden); also at the same locality, *745*.

50. **Homalobus Gibbsii** (Kellogg) Rydb. comb. nov.

Astragalus Gibbsii Kellogg, Proc. Calif. Acad. **2**: 161. 1862.

Astragalus Gibbsii was described from the headwaters of the Carson River. Since Kellogg's description is not complete and since his figure does not show any fruit it is a little doubtful if his plant was the same as the plant usually regarded as this species. This plant was collected by Anderson at Carson City and described by Gray* who included it under *A. cyrtoides*. It is, however, not the original *A. cyrtoides* A. Gray,† for this is described as having linear-oblong leaflets glabrous above, which fits only *H. collinus* and *H. californicus* among the species of this group. As, however, the fruit of *A. cyrtoides* was unknown, the identification has remained doubtful; but the type resembles *H. collinus* so closely that I do not hesitate to refer it to that species.

NEVADA: about Washoe Lake, *C. F. Baker 1072;* King's Cañon, *1035;* Carson City, *Anderson*, in 1863 and 1864; Eagle Valley, *Stretch 38;* Carson City, *M. E. Jones*, in 1883.

CALIFORNIA: Plumas County, *Heller & Kennedy 8868;* Modoc County, *Austin & Bruce 2212;* Sierra County, *Lemmon 977*.

---

* Proc. Am. Acad. **6**: 525. 1865.
† Proc. Am. Acad. **6**: 201. 1864.

51. **Homalobus Plummerae** Rydberg, sp. nov.

Astragalus cyrtoides M. E. Jones, Zoe, **4**: 31. 1893. Not *A. cyrtoides* A. Gray, 1864.

A perennial, with a cespitose woody caudex; stems terete, striate, and villous with spreading hairs, 2–3 dm. high, stipules triangular, striate, distinct, 2–3 mm. long; leaves 4–7 cm. long; leaflets seven to thirteen, obcordate, 8–15 mm. long, 5–10 mm. wide, villous on both sides; peduncles 5–8 cm. long; raceme short and dense, in flowers 2–3 cm. long, in fruit 5–7 cm. long; bracts lanceolate, 2–3 cm. long, longer than the pedicels; calyx pilose-villous, the tube 8 mm. long, gibbous below on the upper side, the upper two teeth triangular, the lower three lanceolate, 1 mm. long; corolla ochroleucous, about 14 mm. long, similar to that of *H. Gibbsii*; pod short-villous, stipitate, the stipe about 8 mm. long, the body lunate, gradually tapering at each end, 2–2.5 cm. long, 7–8 mm. wide, reticulate; seeds reniform, 2.5 mm. long.

TYPE collected in Sierra County, California, in 1875, *J. G. Lemmon 622* (herbarium of Columbia University). The species is dedicated to Mrs. Lemmon, whose maiden name was Plummer. It is related to *H. Gibbsii*, differing in the broader fruit. *Lemmon 78*, without locality, also belongs here.

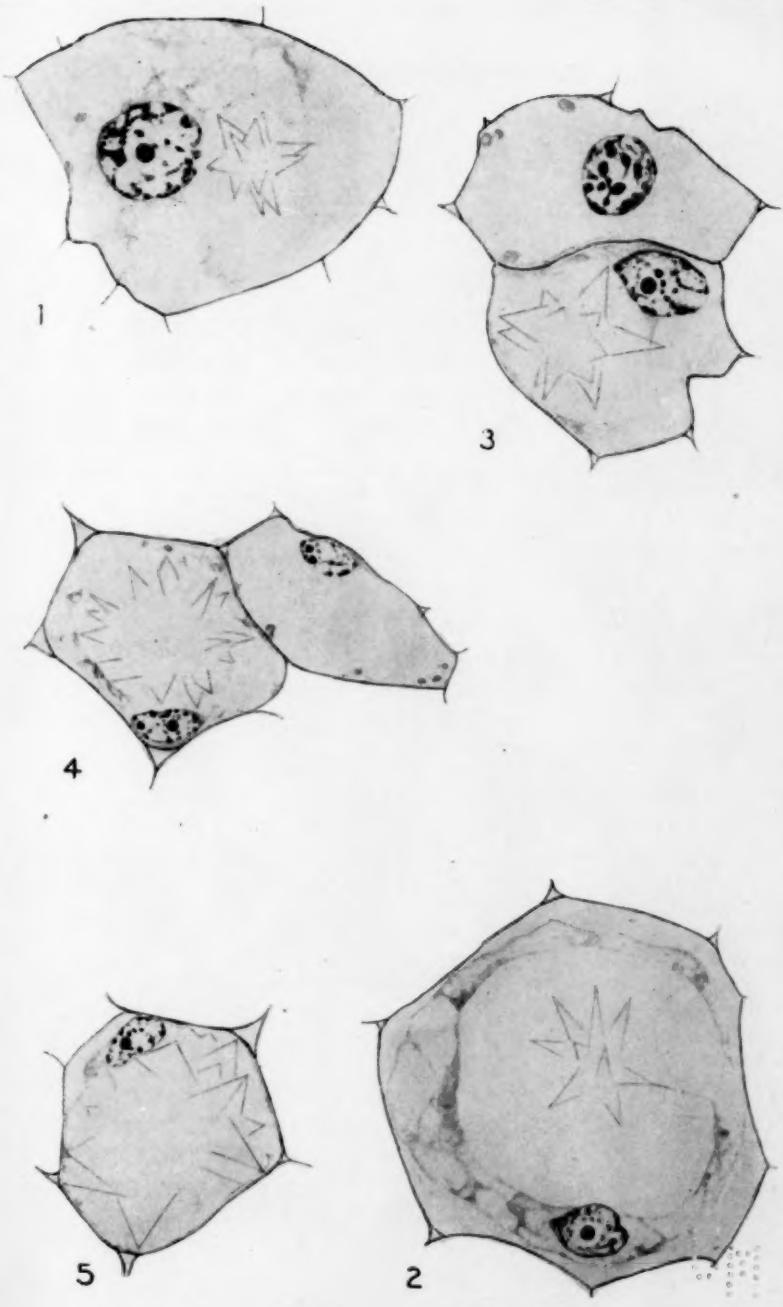
52. **Homalobus sinuatus** (Piper) Rydb. comb. nov.

Astragalus sinuatus Piper, Bull. Torrey Club **28**: 40. 1901.
Phaca sinuata Piper, Contr. U. S. Nat. Herb. **11**: 370. 1906.

This is related to the preceding and the next following species, differing from the former in the short pubescence, from the latter in the much broader pod, and from both in the sinuate lower suture of the pod.

53. **Homalobus Whitedii** (Piper) Rydb. comb. nov.

Astragalus speirocarpus falciformis A. Gray, Bot. Calif. **1**: 152. 1876. Not *A. falciformis* Desf. 1802.
Astragalus speirocarpus curvicarpus Sheldon, Minn. Bot. Stud. **1**: 125. 1894.
Astragalus Gibbsii falciformis M. E. Jones, Contr. West. Bot. **8**: 23. 1898.
Astragalus Gibbsii curvicarpus M. E. Jones, Contr. West. Bot. **10**: 62. 1902.



GAISER: CRYSTALS OF ANTHURIUM

Astragalus Whitedii Piper, Bull. Torrey Club **29**: 224. 1902.
Homalobus curvicarpus Heller, Muhlenbergia **2**: 86. 1905.
Astragalus curvicarpus Macbr. Contr. Gray Herb. II. **65**: 38. 1922.

This is a fairly well known plant but has usually been considered a variety under different species. Heller raised it to specific rank, not knowing that it was the same as *A. Whitedii* Piper.

OREGON: Malheur County, *Leiberg 2187, 2332;* Stein's Mountain, *T. Howell,* in 1885; Rock Creek, *Leiberg 66.*

IDAHO: Nampa and Boise, *Mulford,* in 1892; Shoshone Falls, *Nelson & Macbride 1839;* Plymouth, *Macbride 75;* Big Butte, *Palmer 232.*

NEVADA: Pah-Ute Mountains, *S. Watson 282;* Reno, *Kennedy,* in 1901; *Curran,* in 1885.

CALIFORNIA: Goose Lake, *Mrs. Austin,* in 1885; Eagle Lake, *Mrs. Austin,* in 1879; *Brandegee,* in 1887; Grenada Station, Siskiyou County, *Heller 8066;* without locality, *Lemmon, 77;* Fall River, Shasta County, *Hall & Babcock 4252;* Sierra County, *Lemmon 621.*

54. **Homalobus subglaber** (A. Gray) Rydb. sp. nov.

Astragalus collinus subglaber A. Gray, in herb.

A perennial, with a cespitose caudex; stems 2–3 dm. high, striate, glabrous or nearly so; stipules deltoid, distinct, 2 mm. long; leaves 4–8 cm. long; leaflets 11–25, oblong, obovate or oblanceolate, 5–10 mm. long, 2–5 mm. wide, glabrous above, sparingly short-hairy beneath, often only on the margins and midrib, truncate or retuse at the apex, acute at the base; peduncles 5–10 cm. long; raceme 3–5 cm. long; bracts lanceolate, 2 mm. long; calyx villous, the tube 8 mm. long, gibbous on the upper side, the upper two teeth broadly triangular, the lower three lanceolate, 0.5 mm. long; corolla ochroleucous, 14 mm. long, similar to that of *H. collinus*; pod sparingly short-pubescent, stipitate, the stipe 8–10 mm. long, the body arcuate, 12–18 mm. long, 3 mm. wide.

TYPE collected on John Day River, Oregon, May 11, 1882, *Thomas I. Howell* (herbarium of the New York Botanical Garden).

This was distributed by Howell under the name *Astragalus collinus subglaber* A. Gray, but it is evidently more closely related to *H. Gibbsii,* lacking the long dense pubescence of the latter

species. The little pubescence on the lower surface of the leaves and the calyx and pod is similar to that of *H. curvicarpus* but sparser. The pod, however, is more like that of *H. Gibbsii*. Besides the type the following specimens belong here:

OREGON: locality doubtful, *Lloyd*, in 1898; Moro, *N. Morrison*, in 1894; Eastern Oregon, *Cusick 1878*.

55. **Homalobus speirocarpus** (A. Gray) Rydb. comb. nov.

Astragalus speirocarpus A. Gray, Proc. Am. Acad. **6:** 225. 1866.

Gray formed a section from this and *H. podocarpus* on account of the thick sutures, which according to him separate from the valves of the pod, a character which is not manifest in the herbarium specimens seen. The flower of this as well as of *H. podocarpus* is the same as that of *H. collinus* and *H. Gibbsii*, and the pod of *H. speirocarpus* is practically the same as in the latter species except that it is longer, more reticulate and more curved often forming two almost complete circles.

WASHINGTON: Columbia River, opposite Alkali, *Howell*, in 1882; North Yakima, *Griffiths & Cotton 45;* Natchey Valley, *Piper 2758;* Wenash, *Lyall;* Yakima County, *Henderson 2351; Brandegee 32, 728;* Morgans Ferry, *Suksdorf 277*.

56. **Homalobus alvordiensis** (M. E. Jones) Rydb. comb. nov.

Astragalus alvordiensis M. E. Jones, Contr. West. Bot. **10:** 67. 1902.

Notwithstanding the fact that the author placed this species in another part of the genus *Astragalus**, the species is evidently closely related to the preceding, differing in the small flowers and fruit. The latter is similar, less spiral and more turgid. It is known only from the type locality.

57. **Homalobus podocarpus** (Hook.) Rydb. comb. nov.

Phaca podocarpa Hook. Fl. Bor. Am. **1:** 142. 1831. Not *Astragalus podocarpus* Meyer, 1831.

Astragalus sclerocarpus A. Gray, Proc. Am. Acad. **6:** 225. 1866.

Though the specific name *podocarpus* is not available in *Astragalus*, it is in *Homalobus*. The pod is quite different in

* Jones has corrected this error in his recent "Revision".

structure from all the preceding species of this group. It approaches that of *H. Plummerae* but is distinguished by the thick sutures. The habit of the plant is more like that of *H. collinus*.

WASHINGTON: Columbus, Klickitat County, *Suksdorf*, in 1909; same locality, *Suksdorf 852*, in 1886; Douglas County, *Sandberg & Leiberg 312;* Egbert Springs, *Sandberg & Leiberg*, in 1893; North Yakima, *Henderson 2352;* Yakima County, *Brandegee 727; Suksdorf 279, 280;* Pasco, *Piper 2955;* Walla Walla, *Colton 1043*.

OREGON: Alkali, *T. Howell*, in 1882.

58. **Homalobus bicristatus** (A. Gray) Rydb. comb. nov.

Astragalus bicristatus A. Gray, Proc. Am. Acad. **19:** 75. 1883.

This species is evidently related to the preceding, the flowers being practically those of this group of *Homalobus*, but on account of its more turgid, leathery fruit it is somewhat anomalous in the genus.

CALIFORNIA: San Bernardino Mountains, *Parish 3000, 1277, 1277a, 3743;* San Antonio Mountains, *H. M. Hall 1247;* San Gabriel Mountains, *Abrams & McGregor 646; Parry & Lemmon 92*.

G. PORRECTI

59. **Homalobus porrectus** (S. Wats.) Rydb. comb. nov.

Astragalus porrectus S. Wats. Bot. Kings Rep. 75. 1871.
Tragacantha porrecta Kuntze, Rev. Gen. Pl. 947. 1891.

This species is rather unique in the genus *Homalobus*. It the pod is taken into consideration, it might have been placed among the *Collini* as it is somewhat similar to that of *H. Tweedyi*, the stipe being ascending and the body erect; but the flower is not that of this group, for the calyx-tube is short-campanulate and the calyx-lobes elongate and of the same length, while the banner is narrow, retuse at the apex, and much longer than the other petals. It is therefore best to regard this species as constituting a section by itself.

NEVADA: Trinity Mountains, *S. Watson 284;* Reno, *Stokes*, in 1900.

The rest of the groups included by me in *Homalobus*, I rather think, should be removed from the genus. *Astragalus loncho-*

carpus A. Gray evidently does not belong there. *A. Hallii* A. Gray is just as good a species of *Phaca* as of *Homalobus*. The disposition of *A. flexuosus* and its allies is harder to settle. In general habit it resembles some of the species of *Homalobus* but the pod is terete, and it would be better to limit that genus to the flat-podded species.

KENTROPHYTA Nutt.

The genus *Kentrophyta* was established in 1838, in Torrey & Gray's Flora of North America. It was based on two species, *K. montana* and *K. viridis*, with an unnamed variety of the former. Gray merged the genus into *Astragalus* and united the species under the name *A. Kentrophyta* A. Gray. Thirty-three years later Watson described a species under the name *A. tegetarius* and a variety under the name *A. Kentrophyta elatus*, but failed to see the close relationship of the former to *A. Kentrophyta*, placing it in a far remote section of *Astragalus*. In 1899 A. Nelson added a fourth species, *A. aculeatus*, to the group. The remaining species have been described by the present author.

The species are very closely related and some botanists are inclined to regard them as a single variable species. If so this would have at least eight marked varieties.

1. KENTROPHYTA MONTANA Nutt. This species, the type of the genus, is characterized by the scarious stipules, united high up, long-acuminate or cuspidate, but scarcely spinulose, by the subulate leaves, scarcely narrowed at the base and by the very compressed pod. It is the most eastern and northern and the best known of the species, ranging from Saskatchewan and Alberta to Colorado and western Nebraska. Sheldon changed the name to *Astragalus viridis*, mistaking it for *Kentrophyta viridis*.

SASKATCHEWAN: Gull Lake, *J. Macoun;* Cypress Hills, *27;* Milk River, *10191*.

MONTANA: Yellowstone, *Hayden*.

SOUTH DAKOTA: White River, *Wallace;* Smithville, *T. A. Williams*.

WYOMING: Bitter Creek, *Britton;* "Rocky Mountains," *Nuttall;* Pine Bluffs, *A. Nelson 3621;* Badger, *2751;* Upper Platte, *Geyer 123*.

NEBRASKA: Scotts Bluffs, *Rydberg 79;* Belmont, *Webber;* Court House Rock, *Rydberg 79a.*

NEW MEXICO: Upper San Juan, *McComb's Expedition;* Inscription Rock, *Bigelow* (Whipple Expedition).

2. KENTROPHYTA VIRIDIS Nutt. This has been ignored by all later authors, except myself, though Nuttall pointed out that the green stipules were different in being distinct nearly to the base, more attenuate and sometimes spinulose-tipped. It seems to be a rare species, as I have seen only one collection besides the type.

WYOMING: Platte Plains, *Nuttall.*

COLORADO: Palisades, *Crandall,* in 1898.

3. KENTROPHYTA IMPENSA (Sheld.) Rydb. This was first described as *A. Kentrophyta elatus,* which name Sheldon changed to *A. viridis impensus.* It differs from *K. montana* in the elongated stems and in the long, almost distinct and decidedly spinulose stipules; from *K. viridis* in the stiff, spiny leaflets and in the lanceolate pod, 6–7 mm. long. Evidently M. E. Jones* mistook this species for *K. montana.*

COLORADO: Grand River Cañon, *Eastwood.*

UTAH: Maple Cañon, *Garrett 2647;* Fish Creek Cañon, *2512;* Lost Creek, *Jones 5833;* Southern Utah, *Parry 54;* Beaver Valley, *Palmer 122.*

NEW MEXICO: Shiprock Agency, *Standley 7850;* Fort Wingate, *Dr. Matthews,* in 1883.

ARIZONA: Navaho Reservation, *University of Arizona.*

NEVADA: Holmes Creek Valley, *Watson 291;* Bennett Springs, *Purpus 6275.*

4. KENTROPHYTA TEGETARIA (S. Wats.) Rydb. Watson placed *A. tegetarius* between *A. pauciflorus* (*Homalobus vexiliflexus*) and *A. miser,* but it is really a very close relative of *K. montana,* differing in the smaller flowers in more elongate racemes and in the shorter leaflets, distinctly tapering to the base as well as to the apex. This species seems to be confined to the East Humboldt or Ruby Mountains of Nevada.

NEVADA: East Humboldt Mountains, *S. Watson 286;* Death, *Heller 9223.*

* Zoe 3: 298.

5. KENTROPHYTA ACULEATA (A. Nels.) Rydb. This was first collected by Nuttall and first described as *K. montana* β in Torrey & Gray's Flora. It was again described as *A. tegetarius implexus* Canby. M. E. Jones* makes the statement that it "does not seem to be worthy of varietal rank, as it is only a condensed form." Evidently Jones had misinterpreted *A. tegetarius* S. Wats., for *H. aculeatus* has much larger flowers, 5–7 mm. long, on very short peduncles, while in *A. tegetarius* they are only 3–5 mm. long and in racemes equalling or exceeding the leaves. Jones also in two places† states, first that *A. aculeatus* is "a form of *A. Kentrophyta*," and later that it is "*A. tegetarius*." Neither is true, though it is related to both.

OREGON: Wallovoa Mountains, *Cusick 2350, 1364.*

MONTANA: Cedar Mountain, *Rydberg & Bessey 4487.*

WYOMING: Dome Lake, *A. Nelson 2445;* Union Pass, *1077;* Nez Perces Creek, *6205;* Sheep Mountain, *Tweedy 256;* between Sheridan and Buffalo, *Tweedy 3189;* Big Horn Mountains, *Tweedy,* in 1898; Yellowstone Park, *R. S. Williams,* in 1888; *Rydberg & Bessey 4488; Kelsey,* in 1890; Headwaters of Cliff Creek and Upper Buffalo Fork, *C. C. Curtis;* Doyle Creek, *Goodding 372;* Big Horn Mountains, *Jack 8, 16;* West Yellowstone, *Payson 1913.*

COLORADO: Georgetown, *Jones 679*;* Chambers Lake, *Baker,* in 1896.

UTAH: Big Cottonwood Cañon, *Garrett 1543;* Fish Lake, *Jones 5810;* Alta, *Jones 1127‡; Leonard 181.*

IDAHO: Clyde, *Macbride & Payson 3127;* Mackay, *Nelson & Macbride 1474.*

6. KENTROPHYTA WOLFII Rydb. First described as *Homalobus Wolfii* Rydb. It is known only from the type collection, *Wolf 243,* from South Park, Colorado. It is related to *K. aculeata,* but differs in the small flowers, short leaflets and the grayish loose pubescence.

7. KENTROPHYTA MINIMA Rydb. Closely related to the preceding but differing in the short pubescence, the long stipules, and short pod.

---

* Proc. Calif. Acad. II. **5**: 650. 1895.

† Contr. West. Bot. **10**: 68. 1902; **12**: 11. 1908.

‡ These specimens were first named *A. Kentrophyta,* later corrected by Jones to *A. tegetarius.*

WYOMING: Yellowstone Park, *Tweedy 83; Rose 149.*

8. **Kentrophyta ungulata** (M. E. Jones) Rydb. sp. nov.

Astragalus Kentrophyta ungulata M. E. Jones, Proc. Calif. Acad. II. **5:** 650. 1895.

This is related to the two preceding but differs in the almost white strigose pubescence and in the more tinged pod.

NEVADA: Monitor Valley, *Watson 290;* Sprucemont, *Jones.*

UTAH: George Fork, Terron Creek, *Tidestrom 1366.*

9. **Kentrophyta rotunda** (M. E. Jones) Rydb. sp. nov.

Astragalus tegetarius rotundus M. E. Jones, Proc. Calif. Acad. II. **5:** 650. 1895.

Astragalus Kentrophyta rotundus M. E. Jones, Contr. West. Bot. **10:** 63. 1902.

The synonyms show that this was first regarded as a variety of *K. tegetaria* and later as one of *K. montana.* It is closely related to the former but still more closely to *K. ungulata.* It is a greener plant, the leaves being glabrate above.

UTAH: Panguitch Lake, *Jones 6002;* Loa, *56496;* American Fork Cañon, *Leonard 167.*

Mr. Jones has described another variety, *Astragalus Kentrophyta coloradensis,* from Lee's Ferry, Arizona. This I have not seen, but from the description it seems that it might belong to *K. impensa.*

NEW YORK BOTANICAL GARDEN

The mid-styled form of Piaropus paniculatus

ALICE M. JOHNSON

(WITH TWO TEXT FIGURES)

Certain species of the Pickerel Weed Family (*Pontederia cordata* and *rotundifolia*) are completely trimorphic, while other species are, as far as is known, incompletely trimorphic. Thus, for *Piaropus azureus* (Sw.) Raf., only the short-styled and long-styled forms are known, for *P. crassipes* (Mart.) Britton only the long-styled and mid-styled forms have been reported, and for *P. paniculatus* (Spreng.) Small only the mid-styled form has been observed to date (see FIG. 1).

FIG. 1. Drawing of corolla of flower of *P. paniculatus* opened out to show relative lengths and positions of the pistil and the two sets of stamens (× 3).

At least for *P. paniculatus* seed production is not uncommon. In the spring of 1920 Professor Tracy E. Hazen gathered seed from the single form of this species growing in the Royal Botanical Garden in Trinidad. Plants from this seed grown at the New York Botanical Garden also produced seed. The natural production of seed in this one form raises the question whether there are here any limitations to fertility and seed production such as have been considered characteristic of trimorphic species (see especially Darwin, 1865 and 1877, for *Lythrum Salicaria*). It is obvious that in the production of seed by plants of only the mid-styled form, as in *P. paniculatus*, there is no opportunity for legitimate pollinations, such as exist when two or three different forms are growing together. There is, however, opportunity for discriminative fertilizations involving the two sets of stamens either in selfing or in crossing and also for variation among plants either in self-compatibility or in cross-compatibility. It was to determine these points that the investigation here reported was undertaken.

MATERIAL

From seed of *P. paniculatus* brought from Trinidad by Professor Hazen in the spring of 1920, several plants were grown in the New York Botanical Garden. From the seed of one of these a progeny of 17 plants was grown and from the seed of one of these another generation of 20 plants was grown. All these plants were definitely to be classed as mid-styled.

FIG. 2. Stalk of *Piaropus paniculatus* with seventeen fine capsules all from illigitimate self-pollination.

RESULTS OF SELF-POLLINATIONS

The 37 plants of the two generations were all tested for seed production to controlled self-pollinations, using pollen from both sets of stamens. A total of 186 pollinations were made with pollen of long stamens, the number ranging from 1 to 18 flowers per plant. Of these 157 were successful, yielding from 8 to 70 seeds per capsule and with an average of 31.

A total of 118 self-pollinations were made with the pollen from short stamens. Of these there were 24 failures and 94 successes that yielded pods, containing from 6 to 63 seeds per pod with the average at 36.

One stalk of a highly self-compatible plant produced 13 long-selfed pods and 4 short-selfed pods (see FIG. 2). The counts of seeds in the former were as follows: 32, 39, 41, 44, 47, 51, 54, 56, 57, 58, 59, with an average of 50, while the counts for 3 of the short-selfed pods (seed lost from one of the four) were 35, 43, 61, with an average of 49.

For another highly self-compatible plant there were 14 fine pods out of 15 long-self-pollinations and 4 fine pods to 4 short-selfings.

There were a few plants that gave a high proportion of failures and a low number of seed per pod. These failures may have been due to low grades of self-compatibility or to experimental errors in that pollen may not have been applied when the pistils were most receptive or the pollen in the best condition. But every plant produced some pods with viable seeds to both short- and long-pollen.

RESULTS OF CROSS-POLLINATIONS

A total of 33 plants were involved in the cross-pollinations that were made. Of 100 crosses with pollen of long stamens, 62 produced pods with seeds per pod ranging from 2 to 58 and an average of 24. The 73 crosses involving short-pollen gave 50 pods with seed per pod ranging from 4 to 59 and with an average of 30. Among the crosses there were five reciprocals which yielded pods and seeds in each of the four pollinations possible between them.

In all but 5 of the crosses that failed only one flower was used so that no definite evidence exists of the presence of cross-incompatibility in these plants. The results indicate a very general cross-compatibility.

MEASUREMENTS OF POLLEN

H. Müller (1873) reports decided differences in the size of pollen from the different lengths of stamens in the three forms of *Lythrum Salicaria* (see also Darwin, 1877). Darwin (1877) reports such differences based on average measurements for pollen in a species of *Pontederia*. Such differences are reported for *Pontederia cordata* by Halsted (1889) and by Hazen (1918). In these cases the pollen of long stamens is found to be larger than pollen of short stamens while the pollen of mid-stamens is intermediate in size.

In making the measurements here reported pollen grains from several anthers and from several flowers of each plant were mounted in water and numerous measurements made to determine the ranges in size. The pollen of long stamens measured 38–88 μ in length and from 32–70 μ in short diameter. Only

one grain was found 88 μ long, only one 76 μ; and only one 74 μ. For the greatest number of grains the long diameters were from 38 μ to 70 μ, inclusive. The pollen from short stamens measured 34–62 μ in long diameter and 26–54 μ in short diameter.

The amount of overlapping in size of pollen of the two sets of stamens for individual plants was from 0 to 20 μ. For only two plants was there no overlapping. For 21 plants the overlapping was more than 6 μ and for some of these it was as much as 12 μ. This means that for a large number of plants many of the pollen grains in the two sets of stamens were identical in size.

CONCLUSIONS

As far as now known *Piaropus paniculatus* exists as an incompletely trimorphic species or as a homomorphic species with two sets of stamens differentiated as in the mid-styled form of a trimorphic species.

Each of the 37 plants tested with its own pollen either from long or from short stamens produced pods with viable seeds, thus reproducing in some cases abundantly to what constitutes illegitimate fertilization.

There was no evidence of real and inherent differences in the degrees of self-compatibility or of cross-incompatibility. The differences observed may well have involved errors in manipulation.

The mid-styled form of *P. paniculatus* appears to reproduce true to form through seed progenies.

NEW YORK BOTANICAL GARDEN.

BIBLIOGRAPHY

Darwin, Charles. On the sexual relations of the three forms of *Lythrum Salicaria*. Jour. Linn. Soc. Bot. **8:** 169–196. 1865.

————. The different forms of flowers on plants of the same species. London. 1877.

Halsted, B. D. Pickerel weed pollen. Bot. Gaz. **14:** 255–257. 1899.

Hazen, Tracy E. The trimorphism and insect visitors of *Pontederia*. Mem. Torrey Club **17:** 259–484. *pl. 14, 15*. 1918.

Müller, Hermann. Die Befruchtung der Blumen durch Insekten. Leipsig. 1873.

INDEX TO AMERICAN BOTANICAL LITERATURE

1923

The aim of this Index is to include all current botanical literature written by Americans, published in America, or based upon American material; the word America being used in the broadest sense.

Reviews, and papers that relate exclusively to forestry, agriculture, horticulture, manufactured products of vegetable origin, or laboratory methods are not included, and no attempt is made to index the literature of bacteriology. An occasional exception is made in favor of some paper appearing in an American periodical which is devoted wholly to botany. Reprints are not mentioned unless they differ from the original in some important particular. If users of the Index will call the attention of the editor to errors or omissions, their kindness will be appreciated.

This Index is reprinted monthly on cards, and furnished in this form to subscribers at the rate of three cents for each card. Selections of cards are not permitted; each subscriber must take all cards published during the term of his subscription. Correspondence relating to the card issue should be addressed to the Treasurer of the Torrey Botanical Club.

Allen, W. E. Some tide-water collections of marine diatoms taken at half-hour intervals near San Diego, California. Univ. Calif. Publ. Zool. **22**: 413–416. *f. 1.* Je 1923.

Andrews, A. L. Natural versus artificial classification of the Bryophytes. Bryologist **26**: 25–29. 16 Je 1923.

Baker, E. G. *Heliocarpus americanus* L. Jour. Bot. **61**: 177. Je 1923.

Barnette, R. M., & Shive, J. W. The influence of solution volume upon plant growth in relation to reaction change and iron availability in culture solutions. Soil Sci. **15**: 413–425. *f. 1–3.* My 1923.

Bartholomew, L. K., & Jones, E. S. Relation of certain soil factors to the infection of oats by loose smut. Jour. Agr. Research **24**: 569–576. *f. 1, 2.* 19 My 1923.

Baxter, D. V. White pine blister rust in Michigan. Phytopathology **13**: 285, 286. 7 Je 1923.

Benedict, R. C. The mosquito fern (*Azolla*). Am. Fern Jour. **13**: 48–52. *pl. 2.* 11 My 1923.

Hopkins, E. F. The *Sphaerulina* leaf spot of clover. Phytopathology **13**: 117–126. *pl. 8, 9 + f. 1–3.* 13 Mr 1923.

Horn, T. Das gegenseitige Mengenverhältnis der Kohlenhydrate im Laubblatt in seiner Abhängigkeit vom Wassergehalt. Bot. Archiv **3**: 137–173. 15 Mr 1923.

Howe, J. M. George Rogers Hall, lover of plants. Jour. Arnold Arb. **4**: 91–98. 8 My 1923.

Hunnewell, F. W. *Salix serissima* on Long's Peak [Colorado]. Rhodora **25**: 67, 68. 9 Ap 1923.

Jenks, C. W. *Lepachys columnaris* in eastern Massachusetts. Rhodora **25**: 68. 9 Ap 1923.

Kakizaki, Y. Linked inheritance of certain characters in the Adzuki bean. Genetics **8**: 168–177. Mr 1923.

Kakizaki, Y. Self-sterility in Chinese cabbage. Jour. Hered. **13**: 374–376. *f. 20.* 25 Ap 1923.

Kelly, J. P. Astylis *Phlox*. Jour. Hered. **13**: 339–342. *f. 1–4 + frontispiece.* 25 Ap 1923.

"The relation of this variation of *Phlox Drummondii* to the large-eyed flower."

Kitson, L. C. The piñon. Am. For. **29**: 158, 159. Mr 1923. [Illust.]

Krantz, F. A. Permanence of variety in the potato. Jour. Agr. Research **23**: 947–962. *pl. 1.* 24 Mr 1923.

Kränzlin, F. Orchidaceae, Monandrae, Oncidiinae, Odontoglosseae II. Pflanzenreich IV 50: 1–344. *f. 1–29.* 14 Mr 1923.

Includes new American species in *Cyrtochilum* (9), *Oncidium* (55), *Leochilus* (2), *Sigmatostalix* (9), and *Cryptarrhena* (1).

Krieger, L. C. C. Preliminary note on the position of the hymenium in *Physalacria inflata* (Schw.) Peck. Maryland Acad. Sci. Bull. **3**[1]: 7, 8. Ja 1923.

Kryshtofovich, A. *Pleuromeia* and *Hausmannia* in eastern Siberia, with a summary of the paleobotany of the region. Am. Jour. Sci. **205**: 200–208. Mr 1923.

Larsen, J. A. Association of trees, shrubs, and other vegetation in the northern Idaho forests. Ecology **4**: 63–67. 21 F 1923.

León, Brother. A trip to Pico Turquino [Cuba]. Jour. New York Bot. Gard. **24**: 49–62. Mr 1923.

Levine, M. Studies on plant cancers. V. Leafy crown galls on tobacco plants resulting from *Bacterium tumefaciens* inoculations. Phytopathology **13**: 107–116. *pl. 5–7.* 13 Mr 1923.

Lichtenwalner, D. C., Flenner, A. L., & Gordon, N. E. Adsorption and replacement of plant food in colloidal oxides of iron and aluminum. Soil Sci. **15**: 157–165. Mr 1923.

Lloyd, F. E. The cytology of vegetable crystals. Science II. **57**: 273, 274. 2 Mr 1923.

Lorenz, A. Some Hepaticae from Grand Manan, N[ew] B[runswick]. Bryologist **26**: 5. 15 Mr 1923.

Lownes, A. E. *Habenaria hyperborea* in Rhode Island. Rhodora **25**: 44, 45. 6 Mr 1923.

Lutz, F. E. Flowers and their insect visitors. Nat. Hist. **23**: 125–134. Ap 1923. [Illust.]

Mangelsdorf, P. C. Heritable characters of maize. XII. Mealy endosperm. Jour. Hered. **13**: 359–365. *f. 12–15.* 25 Ap 1923.

Marshall, M. A. Proliferous ebony spleenwort. Am. Fern Jour. **13**: 7–13. *pl. 1.* 13 Mr 1923.

Martin, G. W. Food of the oyster. Bot. Gaz. **75**: 143–169. *f. 1–9.* 20 Ap 1923.

Mattoon, W. R. Growth of shortleaf pine (*Pinus echinata* Mill.) planted in District of Columbia and New Jersey. Jour. For. **21**: 284, 285. Mr 1923.

Maxon, W. R. A new *Dryopteris* from Dominica. Proc. Biol. Soc. Washington **36**: 49, 50. 28 Mr 1923.

Dryopteris mollicella, sp. nov.

McClintock, J. A. Peach rosette, an infectious mosaic. Jour. Agr. Research **24**: 307–316. *pl. 1–10.* 28 Ap 1923.

McKinney, H. H. Investigations of the rosette disease of wheat and its control. Jour. Agr. Research **23**: 771–800. *pl. 1–8* + *f. 1, 2.* 10 Mr 1923.

Milbrath, D. G. Downy mildew on lettuce in California. Jour. Agr. Research **23**: 989–994. *pl. 1–3.* 24 Mr 1923.

Miller, R. B. First report on a forestry survey of Illinois. Il inois Nat. Hist. Surv. **14**: 291–378. *pl. 71–100.* Mr 1923. [With map.]

Morris, H. E., & Nutting, G. B. Identification of certain species of *Fusarium* isolated from potato tubers in Montana. Jour. Agr. Research **24**: 339–364. *pl. 1–3.* 28 Ap 1923.

Munz, P. A. Southern California plant notes—I. Bull. S. California Acad. Sci. **22**: 7–11. Mr 1923.

Newton, J. D. A comparison of the absorption of inorganic elements, and of the buffer systems of legumes and non-legumes, and its bearing upon existing theories. Soil Sci. **15**: 181–204. Mr 1923.

Noble, R. J. Studies on *Urocystis Tritici* Koern, the organism causing flag smut of wheat. Phytopatho'ogy **13**: 127–139. *pl. 10* + *f. 1, 2.* 13 Mr 1923.

Nye, H. A. A new station for *Daphne.* Rhodora **25**: 45, 46. 6 Mr 1923.

O'Neal, C. E. A study of the embryo sac development in *Oenothera rubrinervis.* Bull. Torrey Club **50**: 133–145. *pl. 5, 6* + *f. 1, 2.* 7 Ap 1923.

Palmer, E. L. The flowers that bloom in the spring. Cornell Rural School Leafl. **16**[4]: 1–58. Mr 1923. [Illust.]

Parish, S. S. *Cleomella obtusifolia* Torr. & Frem. Bull. S. California Acad. Sci. **22**: 12–14. Mr 1923.

Pemberton, C. C. Natural root graft and the overgrowth of stumps of conifers. Nat. Hist. **23**: 182–191. Ap 1923. [Illust.]

Pennell, F. W. Scrophulariaceae of Cuba. Proc. Acad. Nat. Sci. Philadelphia **75**: 1–21. 24 Ap 1923.

Plitt, C. C. A new species of *Crocynia*. Bryologist **26**: 16–19. *f. 1, 2.* 16 Ap 1923.
Crocynia Moxleyi, sp. nov., from California.

Record, S. J. The Parana pine of Brazil. Am. For. **29**: 215. Ap 1923. [Illust.]

Reed, E. Hypothesis of formative stuffs as applied to *Bryophyllum calycinum*. Bot. Gaz. **75**: 113–142. *f. 1–10.* 20 Ap 1923.

Rendle, A. B. George Clifford's herbarium and the "Hortus Cliffortianus." Jour. Bot. **61**: 114–116. Ap 1923.
Includes discussion of the names *Grislea* L. and *Combretum* L.

Rhodes, G. H. Perpetuating the redwoods. Am. For. **29**: 147–152. Mr 1923. [Illust.]

Richards, B. L. Further studies on the pathogenicity of *Corticium vagum* on the potato as affected by soil temperature. Jour. Agr. Research **23**: 761–770. *pl. 1* + *f. 1.* 3 Mr 1923.

Riddle, L. W. The lichens of the Isle of Pines. Mycologia **15**: 68–88. 30 Mr 1923.
Includes *Monoblastia*, gen. nov., and 14 new species.

Robbins, C. A. *Cladonia Beaumontii* in Massachusetts. Rhodora **25**: 46, 47. 6 Mr 1923.

Robinson, B. L. The need of monographic activity in American botanical taxonomy. Science II **57**: 307–311. 16 Mr 1923.

Rogers, L. M. Development of the prothallium of *Lygodium palmatum*. Bot. Gaz. **75**: 75–85. *pl. 4–6.* 23 Mr 1923.

Rosa, J. T. Note on an indirect effect of spraying potatoes with Bordeaux mixture. Am. Jour. Bot. **10**: 113–116. *f. 1, 2.* 30 Mr 1923.

Safford, W. E. Discovery of the ancestral form of *Dahlia Jaurezii*. Jour. Hered. **13**: 377–381. *f. 21–23.* 25 Ap 1923.

Santos, J. K. Differentiation among chromosomes in *Elodea*. Bot. Gaz. **75**: 42–59. *pl. 3*. 23 Mr 1923.

Sargent, F. H. *Euphrasia canadensis* in Vermont. Rhodora **25**: 84. 24 Ap 1923.

Sargent, F. L. Trees that feed upon themselves. Nat. Mag. **1**: 55, 56. Mr 1923.

Schaffner, J. H. Additions to the catalog of Ohio vascular plants for 1922. Ohio Jour. Sci. **23**: 107–114. Ap 1923.

Seifriz, W. Observations on the cause of gregarious flowering in plants. Am. Jour. Bot. **10**: 93–112. *pl. 12*. 2 Mr 1923.

Setchell, W. A. *Dumontia filiformis* on the New England coast. Rhodora **25**: 33–37. 6 Mr 1923.

Sewell, M. C. Effect of *Andropogon Sorghum* on succeeding crops of *Triticum sativum*. Bot. Gaz. **75**: 1–26. *f. 1–11*. 23 Mr 1923.

Sherman, J. M., & Albus, W. R. Physiological youth in bacteria. Jour. Bact. **8**: 127–140. Mr 1923.

Showalter, A. M. The chromosomes of *Riccardia pinguis*. Am. Jour. Bot. **10**: 170–172. *pl. 20*. 18 Ap 1923.

Showalter, A. M. Studies in the morphology of *Riccardia pinguis*. Am. Jour. Bot. **10**: 148–166. *pl. 16–19* + *f. 1–3*. 30 Mr 1923.

Shull, G. H. Further evidence of linkage with crossing over in *Oenothera*. Genetics **8**: 154–167. Mr 1923.

Siegler, E. A., & Jenkins, A. E. *Sclerotinia carunculoides*, the cause of a serious disease of the mulberry (*Morus alba*). Jour. Agr. Research **23**: 833–836. *pl. 1, 2*. 10 Mr 1923.

Small, J. K. The Austrian field-cress again. Torreya **23**: 23–25. Ap 1923.
Radicula austriaca (Crantz) Small.

Snethlage, E. H. Neue Arten der Gattung *Cecropia* nebst Beiträgen zu ihrer Synonymik. Notizbl. Bot. Gart. u. Mus. Berlin-Dahlem **8**: 357–369. 15 Ap 1923.
Includes 13 new species from Tropical America.

Stout, A. B. Sterility in lilacs. Jour. Hered. **13**: 369–373. *f. 17–19.* 25 Ap 1923.

Sudworth, G. B. The technical nomenclature of North American trees. Jour. For. **21**: 391–396. Ap 1923.

Suessenguth, K. Über den tagesperiodischen Farbwechsel von *Selaginella serpens* Spring. Biol. Zentralbl. **43**: 123–129. *f. 1–7.* 31 Mr 1923.

Tisdale, W. B. Influence of soil temperature upon the *Fusarium* disease in cabbage seedlings. Jour. Agr. Research **24**: 55–86. *pl. 1, 2 + f. 1–10.* 7 Ap 1923.

Tisdale, W. H., Taylor, J. W., & Griffiths, M. A. Experiments with hot water, formaldehyde, copper carbonate, and chlorophol for the control of barley smuts. Phytopathology **13**: 153–160. 4 Ap 1923.

Torrey, R. E. The comparative anatomy and phylogeny of the Coniferales.—III. Mesozoic and Tertiary coniferous woods. Mem. Boston Soc. Nat. Hist. **6**: 41–106. *pl. 8–15.* Ap 1923.

Tottingham, W. E., & Rankin, E. J. The availability of iron in nutrient solutions for wheat. Am. Jour. Bot. **10**: 203–210. *f. 1–4.* 18 Ap 1923.

Toumey, J. W., & Durland, W. D. The effect of soaking certain tree seeds in water at greenhouse temperatures on viability and the time required for germination. Jour. For. **21**: 369–375. Ap 1923.

Uphof, J. C. T. An historic spot for students of genetics. Jour. Hered. **13**: 343–345. *f. 5–7.* 25 Ap 1923.
Recounts a visit to Spanderwoud, Holland.

Vainio, E. A. Lichenes in Insula Trinidad a Professore R. Thaxter collecti. Proc. Am. Acad. Arts & Sci. **58**: 131–148. Ja 1923.
Includes 17 new species.

Valleau, W. D. An important period in the life history of two bacterial organisms causing leaf-spots on tobacco. Phytopathology **13**: 140–144. *f. 1.* 13 Mr 1923.

Watson, E. E. The genus *Heliocarpus*. Bul . Torrey Club **50:** 109–128. 16 Mr 1923.
Includes 3 new species from Tropical America.

Weimer, J. L., & Harter, L. L. Influence of temperature on the pectinase production of different species of *Rhizopus*. Am. Jour. Bot. **10:** 127–132. 30 Mr 1923.

Weimer, J. L., & Harter, L. L. Pectinase in the spores of *Rhizopus*. Am. Jour. Bot. **10:** 167–169. 18 Ap 1923.

Weir, J. R. The genus *Polystictus* and decay of living trees. Phytopathology **13:** 184-186. 4 Ap 1923.

Weir, J. R. *Poria papyracea* (Schw.) Cke. Phytopathology **13:** 187. 4 Ap 1923.

Weston, W. H. A method of treating maize seed to destroy adherent spores of downy mildew. Jour. Agr. Research **24:** 853–860. 9 Je 1923.

Wherry, E. T. Wall ferns in Wilmington, North Carolina. Am. Fern Jour. **13:** 17, 18. 13 Mr 1923. [Illust.]

Wieland, G. R. A mid-Devonian *Callixylon*. Torreya **23:** 32, 33. Ap 1923.

Williams, R. S. *Brachymenium condensatum*, sp. nov. Bryologist **26:** 2, 3. *pl. 1.* 15 Mr 1923.

Willis, L. G., & Carrero, J. O. Influence of some nitrogenous fertilizers on the development of chlorosis in rice. Jour. Agr. Research **24:** 621–640. 19 My 1923.

Wilson, E. H. Northern trees in southern lands. Jour. Arnold Arb. **4:** 61–90. 8 My 1923.

Wilson, R. W. Life history of *Cedrus atlantica*. Bot. Gaz. **75:** 203–208. *pl. 11.* 20 Ap 1923.

Winkler, A. J. A study of the internal browning of the yellow Newton apple. Jour. Agr. Research **24:** 165–184. *pl. 1* + *f. 1, 2.* 14 Ap 1923.

Wylie, R. B. Sperms of *Vallisneria spiralis*. Bot. Gaz. **75:** 191–202. *pl. 8–10.* 20 Ap 1923.